WATER WELL FEASIBILITY AND SITING STUDY

PROPOSED SPECIFIC PLAN AREA
CHALFANT VALLEY AREA
MONO COUNTY, CALIFORNIA

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TABLE OF CONTENTS

ATTACHMENTS

INTRODUCTION

General Statement

This report provides the principal findings, conclusions and preliminary recommendations of our Phase 1 hydrogeologic assessment of the feasibility of siting and constructing new water-supply wells specifically for the proposed residential subdivision portion of the Specific Plan area (APN 26-210-37), at the specific direction of the developer WF Fund II, LLC, whose manager is Workforce Homebuilders LLC (Workforce), and their engineer, Triad/Holmes Associates, Inc. (Triad), via personal communication on August 31, 2004. As shown on Figure 1, “Location Map,” this 29-acre Specific Plan area is located immediately northwest of the intersection of Highway 6 with Chalfant Road in the Chalfant Valley area of Mono County; approximately 14 miles south of the site is the City of Bishop.

Purpose and Scope of Work

Principal purposes of this hydrogeologic assessment are to: provide our preliminary recommendations regarding the hydrogeologic feasibility of siting and constructing at least two new, onsite community-supply water wells; and select potential locations, drilling depths, and drilling methods for the new wells; and assess the magnitude of possible drawdown impacts, if any, caused by the pumping of the proposed wells on nearby, offsite wells.

This Phase 1 hydrogeologic assessment was conducted at the request of Keith Hartstrom of the Mono County Planning Department and included a scope of services that was described in the December 5, 2003 proposal to Mr. Hartstrom, as part of the preparation process for an Environmental Impact Report (EIR) for the proposed Specific Plan area. Our Phase 1 scope of hydrogeologic services is summarized as follows:

Task 1 - Collect and review available geologic and hydrogeologic data from public sources and from our in-house files.

Task 2 - Perform a site reconnaissance of the property. An initial visit was performed on November 13, 2003, and a second site visit was conducted on March 5, 2004. Both visits were conducted by a geologist from RCS, together with Mr. Dean Dougherty of Sierra Geotechnical Services, Inc. (SGSI) of Mammoth Lakes, California.

Task 3 - Provide hydrogeologic analyses of data and information generated during Tasks 1 and 2.

Task 4 - Write and prepare this Phase 1 report with our conclusions and preliminary recommendations regarding the feasibility of developing onsite groundwater resources of sufficient quantity and of acceptable quality for the proposed Specific Plan area.

The scope of services for this Phase 1 hydrogeologic evaluation does not include assessment or identification of any facet of the siting, design, feasibility, effectiveness, viability, operation or maintenance of any proposed wastewater facilities (leachfields). Although the proposed leachfield locations are not shown in this letter-report, minimum spacing requirements are illustrated later in this letter-report, but only to illustrate the required fulfillment of the minimum 100-foot setback requirement between future water wells and leachfields, and the required 150-foot setback between future subsurface water tanks and leachfields, as promulgated by the Lahontan Regional Water Quality Control Board.

Also wholly excluded from our Phase 1 hydrogeologic scope of services for this project is any and all work regarding such issues as: grading and earthwork; surface water runoff; seismicity; faulting; foundation design, and any and all other geotechnical/geologic tasks relating to the proposed development.

Review of Available Data

A key report for this project entitled "Task 1 Report, Preliminary Data Collection and Hydrologic Models for the US-Filter Tri-Valley Surplus Groundwater Program, Mono County, California," prepared by MHA Environmental Consulting, Inc., and others, dated March 9, 2001, was identified during the RCS review of files at the Bishop Public Library. Hydrogeologic information addressed in that report regarding the general Chalfant Valley region includes: average well depths; groundwater levels and hydrographs showing the change in water levels over time in a few wells; estimated groundwater recharge rates; average yearly rainfall estimates; and a "water balance" for the Chalfant area.

Appendix B of the MHA report contains a report titled “Internal Data Report, Task 1.1, Tri-Valley Groundwater Management District Hydrologic Investigation, Benton, Hammil & Chalfant Valleys, Mono County, California” prepared by TEAM Engineering & Management, Inc. (TEAM), dated August 28, 2000. This TEAM report was also acquired by RCS. However, due to privacy concerns, individual well logs and/or driller’s logs for privately-owned wells in the vicinity of the proposed Specific Plan area were not provided in the copy of the TEAM report provided to RCS. Hence, to supplement the TEAM report, representatives of the developer, Workforce and SGSI obtained permission from nearby well owners to obtain a copy of their individual driller’s log from the County. As a result, 12 well logs were obtained and provided to RCS for this project.

In addition to the TEAM report, a supplemental floppy diskette was provided, which included water level data for wells in the Chalfant area. These data were apparently the data used to create the hydrographs presented in the MHA report. Because of the ability to manipulate the data in an electronic format, RCS geologists were able to recreate the Chalfant Valley hydrographs presented in the MHA report in a format that is more useable for the purposes of this project.

RCS geologists also visited the offices of the Los Angeles Department of Water and Power (LADWP). During that visit, maps showing the locations of LADWP-owned wells located in the southern portion of Chalfant Valley and limited water level data relating to those wells were acquired and subsequently reviewed for this project.

FINDINGS

General Site Conditions and Nearby Developments

The proposed Specific Plan area encompasses the approximately 29-acre property that lies at the northwest corner of Highway 6 and Chalfant Road (see Figure 1). Chalfant Road constitutes the southern border of the site, whereas Highway 6 represents the eastern border of the subject property. To the north, the parcel is bordered by privately-owned land. West and south of the subject property, the land is undeveloped but is owned by the LADWP.

Residential housing and commercial developments exist on the parcel to the north of the proposed subdivision. Many residences also exist across Highway 6 to the east, and also in the area to the southwest of the subject property. Commercial property also exists across Highway 6 to the east. Each of those existing offsite homes and businesses likely has its own domestic-supply water well and onsite subsurface sewage system.

Currently, a residence exists on a small portion of the subject property; the remainder of the property has never been developed. Reportedly, the property was used for agricultural purposes in the past, but has not been used for such purposes for the past 20 years or so. Two wells exist on the subject property, at the locations shown on Figure 1.

Proposed Development

Approximately 27 of the 29 acres of the proposed Specific Plan area are to be developed into 48 lots intended for single family dwellings. Each of the proposed single family lots will be approximately 0.43 acres in net area. In addition, an approximately 2-acre parcel will be designated for commercial use. Figure 2, “Detailed Specific Plan Area Map,” has been adapted from a map prepared by Triad, of Mammoth Lakes, California, in order to show the proposed property lines for each of the proposed lots, and the property boundary for the commercial parcel in relation to Highway 6. Also shown on the map are the locations of the proposed roads within the subdivision.

Estimated Water Demands

Water demands for the proposed Specific Plan area are comprised by the following: 48 single family residential lots; 3 additional lots (A,D and E) which will be landscaped; and the commercial parcel. Water for these areas are proposed to be met solely by pumping onsite groundwater. These demands include the following:

1. <u>Annual Specific Plan Area Demand</u>

   A. *Proposed Dwelling Units*
   Estimates of the annual domestic water demand for the proposed residential subdivision have been made based on the experience of RCS geologists with projects similar to the proposed residential subdivision in scope and geographic area. A generally accepted estimation of water use in the area is that a typical single family residence uses approximately 1 acre-foot per year

(AF/yr) of water. This estimation includes household use (showers, toilet flushes, sinks, etc.), as well as typical landscape irrigation (a lawn, flower beds, shrubbery, etc.). Based on this estimation, the 48 single family residences would require approximately 48 AF/yr of water.

B. *Proposed Lots A, D, and E*
Within the residential portion of the Specific Plan area are lots labeled A, E, and D, that exist from north to south, respectively, along the eastern edge of the residential portion of the Specific Plan area (see Figure 2). Lot A reportedly will contain a brick wall along Highway 6 with some landscaping whereas, lots D and E will contain water tanks and propane tanks, respectively, each with some landscaping. The total combined area of the three lots is approximately 0.9 acres. The maximum estimated water demand is approximately 3 AF/yr. Therefore, the total groundwater demand for the residential portion of the Specific Plan area is 48 AF/yr plus 3 AF/yr, or a total 51 AF/yr.

C. *Proposed Commercial Parcel*
Currently it is unknown what type of businesses may occupy the 2 acres of commercial space proposed for the Specific Plan area (see Figure 2). Landscaping for this proposed commercial parcel may entail an estimated total of 0.5 to 1 acres (requiring perhaps 2 to 4 AF/yr of water); an additional water demand of 1 AF/yr would likely be needed for toilet flushing, sink use, etc., for the domestic use of this parcel. Therefore, as a conservative estimate, a maximum annual water demand on the order of 5 AF/yr may be needed by the proposed commercial parcel.

D. *Summary*
The annual Specific Plan area water demand is comprised of both the residential development demand (including lots A, D, and E) and the commercial parcel demand. Hence, a conservative estimate of the maximum estimated water demand for the entire Specific Plan area would be approximately 51 AF/yr plus 5 AF/yr, a total of 56 AF/yr.

2. <u>Annual Residential Use</u>

As specified by Workforce and Triad, the two newly proposed onsite water wells will supply the residential subdivision water system only. Assuming the two proposed wells were pumped on a continuous basis (100% of the time) for an entire year (i.e., 24 hours per day) to meet the estimated 51 AF/yr residential demand, it would be necessary for the wells to produce groundwater at a combined rate of approximately 32 gpm. On a more realistic 33% operational basis (wells pumping 8 hours every day), a combined pumping rate of 96 gpm would be needed from the onsite wells to meet the estimated annual water demand of 51 AF/yr solely for the proposed residential subdivision.

3. <u>Peak Residential Usage</u>

   Triad estimates that, taking into account their local experience, peak residential usage water flow for the residential property can be estimated by doubling the average estimated daily demand. Using the amount calculated above (32 gpm for each 24-hour period), this yields a peak residential usage of 64 gpm.

   Therefore the proposed 96 gpm annual residential water demand (based on 33% operational pumpage; i.e., 8 hours per day) presented above (three times the average daily flow) would conceivably be met by pumping the two proposed water wells, and possibly only one of the proposed water wells.

4. <u>Maximum Residential Water Flow Requirement</u>

   As reported to RCS by Workforce, a new water system for the proposed residential development must be able to sustain a flow of 750 gpm for 2 hours (equal to 90,000 gallons of water), per the Mono County fire flow requirement for the proposed development. This maximum fire flow requirement of 750 gpm, plus the peak residential usage of 64 gpm (calculated in number 3 above), yields a maximum residential water system flow requirement of 814 gpm. In order to meet this requirement, Workforce and Triad have agreed to construct subsurface water storage tanks. Triad reports that adequate storage area has been provided for a number of water tanks in the proposed subdivision. The total volume of storage constructed would depend on the final operational rates of the proposed residential wells.

Rainfall Conditions

RCS assessed rainfall for the Chalfant Valley area using annual historic data monitored by Gage No. 040822; this raingage is located at the Bishop Airport south of the Specific Plan area. Raingage data, which are available for a period of record dating between 1949 and 2003, are shown on a calendar year basis as a bar chart on Figure 3A, “Yearly Rainfall for Bishop.” Annual rainfall during the period of record is seen to range from a low of 1.81 inches in 1989, to a high of 17.09 inches in 1969. Average rainfall during the period of record for this Bishop gage is calculated to be 5.22 inches.

Evaluation of rainfall trends over time is facilitated by creating a curve of the accumulated departure of each year of rainfall to the long-term average annual rainfall monitored by a particular raingage. The results of this curve generation are shown on Figure 3B, “Accumulated Rainfall Departure for Bishop.” Interpretation of the resulting curve is as follows: whenever the curve ascends to the right (such as from 1950 to 1957, or 1976 through 1983), a period of generally above average rainfall has been recorded (i.e., each year of rainfall in these periods was at or above the long-term average; hence these periods are considered to have been hydrologically "wet"). In contrast, whenever the curve descends to the right (such as from 1957 to 1961, 1969 to 1976, and 1983 to 1994), a period of generally deficient rainfall has occurred (i.e., this is considered to be a hydrologically "dry" period, during which each year of rainfall was generally at or below the long-term average annual rainfall).

Analysis of such rainfall trends is important to understanding possible trends in long-term static (non-pumping) groundwater levels over time in the area. In an aquifer system influenced by recharge rainfall, rising or declining water level trends can often be correlated to increasing and decreasing trends in the accumulated rainfall departure curve.

Local Geologic Conditions

Figure 4, "Geologic Map," has been adapted from published regional geologic field mapping compiled by Strand (1967) for the California Division of Mines and Geology (now known as the California Geological Survey).

From geologically youngest to oldest, earth materials underlying the Specific Plan area include:

a. *valley fill deposits (Figure 4 map symbol Qvf)* - As shown on Figure 4, valley fill deposits are exposed at ground surface in the area of the Specific Plan area. This young, Holocene-aged geologic unit consists of relatively unconsolidated sand, silt, and gravel, eroded away from nearby hills and deposited via water flow in streams and creeks on the valley floor. Based on the geologic map by others and on the RCS review of the driller's logs made available to this project by Workforce, it appears that the valley fill deposits likely decrease in thickness from west to east across the valley floor. Therefore, in the area of the proposed development, the expected thickness of these deposits is no more than 20 to 30 feet. Due to the relatively thin and shallow nature of these sediments, the valley fill deposits are not considered to be a viable source of groundwater from future onsite water wells.

b. *alluvial fan deposits (Figure 4 map symbol, Qa)* - Also geologically young, these alluvial fan deposits consist of silt, sand and gravel eroded from the nearby hills and carried down to the valley below by water in creeks or streams. Alluvial fan-type deposits are usually thinner in the foothill area from which they emanate (in this case, the White Mountains, to the east of the Chalfant Valley). Based on this fact, the available driller's logs for wells in the area, the "Qa" alluvium is likely thicker in the center of the valley, and thinner on the eastern and western edges of the valley. This unit is considered the principal potentially water-bearing unit for water wells drilled in the area of the Specific Plan area.

Groundwater in this alluvium occurs between the pore spaces and voids created between the individual silt, sand, and gravel grains. Thickness of the “Qa” alluvium beneath the “Qvf” deposits at the subject property is at least 100 ft, and likely on the order of 300 ft or greater. It is unknown whether or not the Bishop tuff underlies the alluvium in the area of the Specific Plan area; also unknown is at what depth the older alluvium occurs beneath the “Qa” alluvium, principally because of the lack of driller’s logs for wells that penetrate deeper than 130 feet below ground surface in the area of the proposed development.

It should be noted that the “Qa” type alluvium may be difficult to distinguish from the older alluvium when reviewing drillers’ logs or while performing geologic logging of drill cuttings generated during pilot hole drilling for new wells. The earth materials that constitute these formations are likely very similar, and therefore are not readily distinguishable when being observed after being disturbed by a drill bit.

c. *Bishop tuff (Figure 4 symbols Qbp, Qbf, Qbn and Qbv);* Bishop tuff consists of Pleistocene-aged volcanic rocks; while geologic surface exposures occur. Outcrops of the light pink to gray volcanic tuff rocks on the western margin of Chalfant Valley, west of the Specific Plan area. Volcanic in origin, the Bishop tuff is a rhyolitic ash flow, partially welded tuff, nonwelded tuff, and tuff, and is essentially formed by the cooling and hardening of volcanic ash. In the area of the proposed development, this geologic formation contains widely spaced jointing and is considered to be somewhat friable. Based on the relative age of the tuff, it is possibly interstratified with the lower portions of the underlying old alluvium described below.

The thickness of the Bishop tuff below the two younger alluvial-type deposits beneath the proposed development is unknown due principally to a lack of available driller’s logs and also to an absence of sufficiently deep, privately-owned wells in the area. Based on the known outcrop pattern and occurrence of the Bishop tuff in the area, it is not known whether or not this unit even occurs beneath the west Chalfant area.

If the tuff is encountered during the drilling of new water wells at the subject property, then it could be considered a viable source of groundwater, depending on the thickness of tuff rocks penetrated by the water well.

Groundwater in rocks of the Bishop tuff, if encountered, is expected to occur principally within fractures and joints created in the materials after they were deposited and formed. Some water may exist in the pore spaces formed between individual particles, and voids created by volcanic gasses trapped in the rock during its cooling. The amount of groundwater available to wells in these volcanic rocks will depend on such factors as the number, size, frequency, openness, interconnection and lateral continuity of the fractures and joints, and on the percentage of void space (if any), encountered in the rocks during drilling of the pilot borehole at any particular onsite locations.

d. *older alluvium (map symbol, Qoal) - Similar* to the Bishop tuff, this older alluvium is also Pleistocene in geologic age. It is comprised of silt, sand and gravel derived from erosion of the nearby hills. The older alluvium may underlie the "Qa" alluvium beneath the subject property, or may underlie the Bishop tuff, if the tuff even exists at depth below the subject property. Based on its age, the older alluvium may be interstratified with the lower portions of the Bishop tuff in the western portion of the valley, and may also underlie the tuff. The maximum thickness of this older alluvium is unknown, but may possibly be on the order of perhaps 500 feet or greater.

   Similar to the younger alluvium described above, groundwater in the older alluvium occurs in the pore spaces and voids created by grain-to-grain interaction of the silt, sand, and gravel.

Structurally, Chalfant Valley is bounded on the east by a major fault system, known as the White Mountain normal fault, and by other abundant, but more minor faults, on the west side of the valley. Although the direct impact of these faults on the Specific Plan area is not known, it is possible that long-term movement on these faults over time could have increased the potential for inducing more fracturing in the Bishop tuff rocks that lie beneath the subject property. With greater and more intense fracturing, the potential to store and perhaps yield more groundwater at slightly higher rates could have been enhanced in the region impacted by long-term fault movement.

Water Wells

Two water wells currently exist on the residential portion of the Specific Plan area, an agricultural well and a domestic well, the locations for which are shown on Figures 1 and 2. No data are available regarding the construction details of these wells. Based on RCS field observations, the agricultural well was constructed using 14.5-inch inside diameter (ID) steel casing. It is unknown if this steel casing is just a shallow "landing" or conductor casing, or if the well was constructed entirely using 14.5-inch casing. Apparently, the wellhead is not properly sealed to prevent entry by surface runoff, insects or small animals.

Numerous single-family houses exist relatively near the proposed development. Each of these houses most likely is provided groundwater from an individual, privately-owned onsite well. In Figure 5-2 of the 2001-dated MHA report (referenced above under the "Review of

Available Data" heading), a map was provided to show the locations of many wells known at that time in the Chalfant Valley area; however, due to the small scale of the map, individual well locations are impossible to accurately distinguish. Based on that map, a majority of the Chalfant Valley area wells are within a radius of two miles from the intersection of Highway 6 and Chalfant Road. MHA stated on page 3-6 of their 2001 report that 107 wells existed in the Chalfant area at that time, and that known depths for those wells ranged from 55 to 400 feet below ground surface (ft bgs).

Figure 5, "Offsite Well Location Map" shows the approximate locations of several offsite wells that were either directly observed by RCS geologists during our site visits in November 2003 and March 2004, or were considered to exist based on the presence of a single-family dwelling or business. It should be noted that some of the wells shown on Figure 5 were located by means of a "windshield survey"; that is, the RCS geologist approximately located these wells while driving a car on public roads. In addition, some of the well locations shown on Figure 5 were plotted based on the locations of buildings shown on topographic maps of the area. Hence, these locations are not a complete record of all possible wells in the area, but do offer a quantitative sense of the general number of privately-owned wells, and their locations relative to the Specific Plan area.

Information on well depths, perforation intervals, pumping rates, water levels and water quality for these privately-owned wells is not readily available because the well log data are considered confidential by Mono County and by the California Department of Water Resources (DWR).

However, in an effort to collect data on specific well construction in the area, Workforce representatives contacted local well owners, asking for permission to obtain driller's logs from the County pertaining to their individual wells. Figure 5 shows the locations of the wells for which driller's logs were made available. It is important to notice that of the 12 wells for which driller's logs were made available, two are located east of Highway 6. Table 1, "Summary of Well Construction Data," was created to summarize key construction parameters of each well, to provide our interpretation to the depth to the Bishop tuff in each of the wells, and to tabulate the static water levels and estimated pumping rates as originally measured by each individual well driller. Noteworthy information listed on the table includes:

- Five of the wells were constructed in the 1980s, four of the wells were constructed in the 1990s, and three of the wells were constructed in 2003.
- Well depths range from 95 ft bgs to 220 ft bgs. Six of these wells had depths between 100 and 160 ft, whereas five wells had depths that ranged between 160 ft and 220 ft.
- Cement sanitary (annular) seals range in depth from 20 ft to 25 ft in 10 of the wells reviewed; the remaining two wells have well seals of 31 ft and 36 ft in depth.
- Based on our interpretation of the driller's description of the drill cuttings, and also based on the locations of the individual wells shown on Figure 5, it appears that the depth below ground surface to the top of the Bishop tuff increases to the east and to the north of the subject property. In addition, the total thickness of the Bishop tuff is considered to decrease in a west to east direction across the valley.
- Two of the wells located east of Highway 6 do not appear to penetrate into the Bishop tuff; therefore they are likely perforated entirely within the alluvial deposits.

Estimated Groundwater Extractions and Recharge

From our review of available reports, it appears that the original estimate of groundwater extraction from the Chalfant Valley area was prepared by Philip Williams & Associates (PWA, March 1980); that report was provided as an Appendix to the TEAM report of August 28, 2000. In that PWA report (Table 2 therein), total groundwater pumpage for known domestic and irrigation purposes was reported to be 1,200 AF/yr at that time.

In the March 2001 MHA report, groundwater modeling was conducted for an area that extends from the southern end of Chalfant Valley northward to the California-Nevada border. The proposed Specific Plan area would lie within the southern portion of this MHA-modeled area. In their report, MHA also provided an estimate of the total amount of groundwater pumped from the Chalfant Valley area, using data prior to the March 2001 date of their report. Apparently, this MHA estimate of total pumpage was first abstracted from data in earlier reports prepared by others (the PWA 1980 report) and then this MHA estimate was subsequently calibrated and/or adjusted upward in some manner by MHA to fit the groundwater model being developed for their referenced report. As listed on Table 6-6 in the MHA report, groundwater extractions for the year 2000 in the Chalfant Valley area were estimated at 3,500 AF/yr.

Similar to their procedure for estimating groundwater extractions in the Chalfant Valley area, groundwater recharge in the Chalfant Valley area was also estimated by MHA by first abstracting data from earlier work performed by others, and then by calibrating and/or adjusting those figures upward to balance their modeling data. MHA also suggested that perhaps their estimates of pumping, recharge, and aquifer transmissivity are too high; specifically, as stated on page 6-38 of their report: "…the sensitivity analysis suggests that recharge, pumping and transmissivity may be lower than the calibrated model." Estimated groundwater recharge in the Chalfant Valley area, as presented on Table 6-6 in the MHA report, was approximately 3,737 AF/yr for 2000; this figure does not include groundwater underflow through the Chalfant area.

It is important to note that the values calculated in the MHA report were based on their conceptual model (described in the March 2001 report on page ES-8) and on their opinion that groundwater outflow from the basin must be greater than groundwater inflow. This MHA opinion is based on their contention that groundwater levels were generally decreasing in the Chalfant Valley area between roughly 1983 and the last year of data (2000) available for their 2001-dated report, (as discussed below under the heading "Estimated Groundwater Extraction and Recharge"). In addition, page 6-37 of the March, 2001 MHA report stated that the pumping in Chalfant Valley exceeded the recharge at the time of their study based on the "conceptual model and hydrographs of groundwater levels." However, data presented on their Table 6-6 suggests that recharge was greater than pumping at the time of their study. If their contention that water levels in the Chalfant Valley area are in "overdraft," this may be in conflict with their Table 6-6 data that shows that recharge was greater than pumping.

To further help assess the magnitude of groundwater pumpage in the Chalfant Valley area, and to help determine whether or not the basin is in an overdraft situation, RCS contacted Mr. George Milovich, the Agricultural Commissioner for Mono County. According to Mr. Milovich (personal communication July 2, 2004), irrigation in the Chalfant Valley area probably has not changed much since the 1970s or 1980s. In fact, Mr. Milovich stated that there is likely less irrigation now than there was in the 1970s and 1980, particularly east of Highway 6. Also, land use in general is roughly similar; a few tens of acres may have changed from residential to agricultural or vice versa, but overall, land use in the area of the proposed development is relatively the same as it was in the 1970s and 1980s. Assuming the 1980 PWA estimate of groundwater extraction is relatively reliable, then based on the information provided by Mr. Milovich, the estimate of groundwater extraction for the Chalfant Valley area as stated in the MHA 2001 report may be overstated.

From our review of the MHA 2001 report, it appears that a graph of the accumulated departure from the average annual rainfall was not created by MHA; hence, MHA did not compare long-term fluctuations in groundwater levels in local wells (shown by their hydrographs) to possible rainfall trends over time that are shown by the accumulated rainfall departure curve; refer to the RCS-prepared accumulated rainfall departure above under the heading "Rainfall Conditions" and also to Figure 3B in this report.

Groundwater Levels

Both the United States Geological Survey (USGS) and the California Department of Water Resources (DWR) maintain databases of groundwater levels that are accessible via the Internet. However, based on our review of these databases, neither of those web sites contained groundwater level data specifically for the Chalfant Valley.

Mr. Dougherty of SGSI visited the project site on August 21, 2004 and obtained a static water level measurement at approximately 4:00 PM from the onsite agricultural well. The static water level was measured to be at a depth of 49.3 ft below ground surface (ft bgs) in this well. In addition to measuring the onsite well, static water levels in three other offsite wells were measured. Permission for measuring the static water levels in these offsite wells was coordinated by Ms. Allison Knight of Workforce for Mr. Dougherty. Water levels were measured in wells to the east of the Specific Plan area (east of Highway 6), and also to the southwest of the Specific Plan area. These measured static water levels were within a range of roughly 47 ft to 49 ft bgs, and are considered to be consistent with the water level measured in the onsite agricultural well.

Based on our assessment of available data, current static (non-pumping) groundwater levels in the general vicinity of the Specific Plan area are likely to be in the range of 45 to 50 ft below ground surface (ft bgs). Although no extensive basic water level data measured over time were available to RCS for the purposes of this report, the MHA 2001 report contains 14 hydrographs for the greater Chalfant Valley area, all of which were provided on Figure 5-16 in the 2001 MHA report. Water level data from 14 wells are plotted versus time on that figure in their report; the majority of the data begins in approximately 1983. Water levels plotted on that Figure 5-16 hydrograph were considered by MHA to be declining over time.

In multiple instances, the MHA report provides a correlation between the possibility of over-pumping the aquifer (“overdraft”) in the Chalfant region and the overall trend of declining water levels noted on the hydrographs for the wells; the maximum period of water level measurements for any of the hydrographs in their report is roughly 15 years.

Using the electronic data included with the TEAM report, RCS geologists re-plotted hydrographs for wells used in the MHA report that were deemed to have relatively long-term and extensive data. The hydrographs of Well Nos. 1, 40, 45a, 49, 52, 53, 55, 64, and 65 were plotted together with the RCS-generated accumulated rainfall departure curve, using the same horizontal time scale. The same water well number and/or name used by the MHA report is used for the RCS hydrographs. However, due to the number of data points available and/or the amount of time covered by the data points, only hydrographs for Well Nos. 1, 45a, 49, 53, and 55 have been included with this report; refer to Figures 6A through 6E, ”Hydrograph and Accumulated Rainfall Departure.”

In comparing the various hydrographs to the rainfall departure curve, it is noteworthy that the general downward trend of water levels over time on the hydrographs is similar to the downward trend (the drought period) illustrated by the accumulated rainfall departure curve from roughly 1983 to 2000. In each of the Figures 6A-6E, the shape of the hydrograph curve corresponds reasonably well with the shape of the accumulated departure curve for that period. On Figure 6B, Well No. 45a has water level data that illustrates this point rather clearly. The abundance of water level measurements (25 total measurements extending from 1983 to 2000) for Well No. 45a shows what is considered to be a very close correlation between the accumulated departure curve and the hydrograph created from the water level measurements of this well. This implies that the water levels in at least this well respond directly to rainfall (and recharge) surpluses and deficits. The lack of continuous water level data between the 1970s and 1983 masks the possibility that water levels were higher during that period, and perhaps that they have not undergone the MHA-reported steady decline over time.

With the exception of Well No. 49 (Figure 6C), each of the Figure 6 wells has a water level measurement in the year 2000. In each of these cases, the year 2000 water level is lower than the earliest available water level data for each respective well.

The comparison of the various graphs on Figures 6A-6E suggests that groundwater levels in the Chalfant Area are lower, in part, due to the rainfall deficit that began in 1983, not solely due to the reported over-pumping in the Chalfant area. Therefore, it is likely that, with the same amount of groundwater extraction that was presented in the MHA report, or perhaps even an increased amount, and with the possible resumption of normal water-supply conditions in the area over the long term (i.e., a resumption of more normal annual rainfall), groundwater levels may once again rise to or near former levels.

It is also important to consider the static water level data tabulated on Table 1 for the nearby wells; these water levels were reported by the driller as of the date of the well construction. Figure 7, “Composite Hydrograph versus Accumulated Rainfall Departure,” has been prepared to represent a composite hydrograph for those various wells using the water levels shown on Table 1 and to permit a comparison with the accumulated rainfall departure curve. Water levels in wells located east of Highway 6 and water levels in wells with perforations that start deeper than 100 ft were excluded. Therefore, the water level data making up the composite hydrograph includes only those for wells that are located relatively near each other and that also likely have similar perforated intervals. As was revealed on Figures 6A-6E, Figure 7 shows that the composite hydrograph correlates reasonably well with the trends displayed by accumulated rainfall departure curve, corroborating the possibility mentioned above that the static water levels in the Chalfant Valley area may not be declining continuously over time due simply to over-pumping (as reported by others), but rather are responding to a recent period of decreased rainfall (and recharge).

It should be noted that an attempt was made by RCS to collect water level measurements at the wells for which hydrographs were created for this project, so that the hydrographs could be updated with current data for the 2004. RCS geologists contacted Ms. Carol Ann Mitchell of the Mono County Tri-Valley Groundwater Management District. During those discussions, we expressed our desire to collect water level measurements in selected wells, to help confirm or deny the assertions made in the MHA report that the Chalfant Valley was in a state of “overdraft.” A specific list of water wells to be monitored was provided to Ms. Mitchell, accompanied by a map showing the approximate location of the water wells. After conferring with the attorney for that District, our water level monitoring request was denied due to confidentially concerns.

Groundwater Flow Direction

Groundwater in the area of the proposed development is considered to regionally flow in a southerly direction across the Chalfant Valley. Because of the low hills to the west of the site, the groundwater may have a small component of southeasterly flow beneath the subject property. This assessment concurs with the groundwater elevation contour maps provided in the MHA March 2001 report, Figures 6-11 and 6-12 (not included herein).

Groundwater in Storage

An approximate calculation was made to assess the amount of groundwater that may be in storage beneath the Specific Plan area relative to the amount of groundwater that may be pumped for the proposed project. According to the most recent static water level data acquired by SGSI, the water level in the onsite agricultural well was measured to be approximately 50 ft bgs. Also, as stated in the geology section, the “Qa” alluvium (the principal water bearing geologic unit for a new well drilled on this property) likely extends to a depth of 250 to 300 ft bgs. Therefore the current vertical saturated thickness of sediments beneath the property is on the order of 200 ft to 250 ft. By multiplying the known ground surface area of the Specific Plan area (29 acres) times the saturated vertical thickness of sediments, an estimated volume of 5800 AF to 7250 AF of currently saturated sediments exist solely beneath the property.

To determine the volume of groundwater beneath the property that is available to onsite wells, it is necessary to multiply the calculated volume of saturated sediments by the specific yield of these sediments. Here, specific yield represents the percentage of groundwater that will drain by gravity from the sediments. We estimate the specific yield of the local alluvial-type sediments to be 10 percent. Hence, the current volume of groundwater beneath the property that is available to onsite wells is approximately 580 AF to 725 AF. It is important to remember that these figures do not include inflow (including rainfall recharge and groundwater underflow) or outflow beneath the subject property, and only include the estimated amount of groundwater in storage that is currently in the sediments directly beneath the subject property. As calculated under the heading “Estimated Water Demands” above, the total annual water demand for the Specific Plan area is estimated at 56 AF/yr, an amount that represents only 8 to 10 percent of the groundwater that is currently in storage directly beneath the subject property.

Water Quality

On June 1, 2004, Mr. Dougherty collected a groundwater sample from the onsite agricultural well (see Figure 1). Great Basin Laboratories, Inc. received the sample and analyzed it for selected constituents. Limited water quality data derived from that laboratory are summarized below:

1. Dissolved metals were analyzed, and resulted in concentrations below the State Maximum Contamination Levels (MCL) for each constituent in the sampled wells. Metals analyzed include: antimony arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, titanium, vanadium, and zinc. From the laboratory test results, the laboratory reported results as “less than” a particular concentration for each metal, as opposed to the actual concentration encountered in the groundwater sample.
2. Concentrations of both iron and manganese were reported by the laboratory to be less than 0.05 parts per million (ppm) in the sample; 1 ppm is equivalent to 1 milligram per liter (mg/l). Therefore, the concentrations of both iron and manganese are less than the State secondary Maximum Contaminant Level (MCL) for each constituent; these secondary MCLs are 0.3 ppm and 0.05 ppm, respectively.
3. Nitrate as Nitrogen (NO_3-N) was reported at a concentration of 0.6 ppm in the groundwater sample, much lower than the State MCL of 10 ppm for this constituent.
4. Total dissolved solids (TDS) was reported at a concentration of 216 ppm, below the State secondary MCL range of 500 ppm to 1,000 ppm for TDS. From the limited water quality data, it appears that the laboratory TDS value was calculated using a ratio between the laboratory electrical conductivity (EC) value and the TDS.

5. A pH of 7.11 was reported for the sample.

CONCLUSIONS AND RECOMMENDATIONS

The following presents the key conclusions and preliminary recommendations of this Phase 1 hydrogeologic assessment of the proposed Specific Plan area:

1. Hydrogeologic Conditions

   Subsurface geologic conditions are interpreted to include in stratigraphic order, as measured from below ground surface: valley fill deposits to a maximum depth of 30 ft bgs; alluvial fan deposits between the approximate depths of 30 ft to a minimum depth of 100 ft; and then possibly Bishop tuff and/or older alluvium. It should be noted that it may be difficult to distinguish alluvial fan deposits from older alluvium in the field via the geologic logging of drill cuttings generated from well drilling procedures.

   The principal, potentially water-bearing earth materials for new onsite wells are considered to be the alluvial deposits and perhaps the underlying Bishop tuff and/or older alluvium. The overlying valley fill sediments are not considered to be a viable source of groundwater for the proposed project due to their lack of lateral extent and their limited thickness.

   Groundwater within the alluvial fan deposits is expected to occur under water table (unconfined) conditions; this groundwater will exist within the pore spaces (voids) between the individual sand and gravel grains which comprise these deposits.

   Groundwater within the Bishop tuff, if encountered, is expected to occur under confined to semi-confined conditions, and principally within fractures and joints created in the rocks after they were deposited and formed. The amount of groundwater available to new wells in this tuff will depend principally on the size, number, frequency, openness, interconnection and lateral continuity of the fractures and joints encountered at the selected drill site.

   Groundwater within the underlying older alluvium, if encountered, is expected to occur under confined conditions but within the pore spaces and voids created by grain to grain interaction of the sediments.

   Regional groundwater flow in the area of the Specific Plan area is likely to be in a south to southeasterly direction.

2. Water Levels.

   A recent April 2004 groundwater measurement by SGSI revealed a current static water level depth of approximately 49 ft bgs in the existing onsite agricultural well. Information on the depth of this well, its perforation intervals, pumping rates, and formations penetrated by the borehole was not available for this project.

Additional water levels recently measured in offsite wells to the east and southwest of the subject property reveal current static water levels at depths on the order of 47 to 49 ft bgs.

A deficit in rainfall and recharge has been experienced in the region for approximately the last few years. A decline in the water levels in the Chalfant Valley may be partially attributed to the reduced amounts of annual rainfall during this period. It is likely that, in the event of a few years of more-normal or even surplus rain, water levels in the Chalfant Valley may increase, with groundwater extraction continuing at the same rate it is today, or even a higher rate than it is today.

3. Existing Water Wells

Two water wells exist on the residential portion of the Specific Plan area, an agricultural well and a domestic well; no data exist to document the construction of either well. Numerous privately-owned, domestic-supply water wells exist on offsite properties that have been developed in areas located to the east, north and southwest of the subject property, although the greatest concentration of these offsite wells is to the east and to the south. The depths, pumping rates, static (non-pumping) and pumping water levels, and water quality of most these proximal offsite wells are unknown and even if the data had been monitored or recorded previously by others, such data would be considered confidential by Mono County and the California DWR.

However, driller's logs for twelve of the nearby wells were collect by Workforce and subsequently reviewed by RCS geologists. Key data for these wells include:

a. Five wells were constructed in the 1980s, four in the 1990s, and three in 2003.

b. Well depths varied as follows: one well is 95 ft deep, six wells extend to depths between 100 ft bgs and 160 ft bgs; and five wells extend to depths of 160 ft bgs and 220 ft bgs.

c. Cement sanitary seals range from 20 ft to 36 ft, in depth; 10 of the 12 wells have seals ranging from 20 ft to 25 ft. A cement sanitary seal depth of at least 50 ft is required for community-supply water wells.

d. The depth of the top of the Bishop tuff in the Specific Plan area appears to increase from west to east and from south to north. It also appears that the thickness of the tuff decreases in an easterly direction across the valley.

e. The 2 of the 12 reviewed wells that lie east of Highway 6 do not penetrate the Bishop tuff; they are likely perforated with the "Qa" type alluvium.

Before drilling any new water wells in the residential portion of the Specific Plan area, the two existing wells (shown on Figures 1 and 2) should be permanently destroyed, at a minimum in accordance with applicable State and County regulations for well destruction. However, based on the location of one of the proposed new wells (discussed below), the existing agricultural well should be destroyed in a manner that exceeds State and County regulations, as follows:

a. A video log should be performed in the agricultural well to determine the total casing depth and perforation intervals within the well.

b. Lightly wire brush the well casing to remove mineral/biological growths and encrustations. Bail sediment fill from the bottom of the casing.

c. Fill the lower portion of the well with cement to a depth of roughly 100 ft bgs.

d. Cut new perforations in the casing with a mills knife perforation tool from a depth of 100 ft up to within approximately 20 ft bgs.

e. Fill the well casing with cement to approximately 20 ft bgs, and place the cement under pressure to force it out through the new perforations.

f. Excavate the soil around the upper 15 ft of casing. Pour a cement mushroom cap over the top of the casing.

g. After the cement for the mushroom cap has set and been inspected by County health officials, the excavation should be backfilled and recompacted.

4. Proposed Specific Plan area

Reportedly, 48 single family dwelling units and a separate 2-acre commercial parcel are proposed for the 29-acre Specific Plan area.

The annual residential usage is estimated to total 48 AF/yr, (exclusive of fire flow requirements) for the dwelling units within the residential subdivision portion of the Specific Plan area; this represents an average use of about 1 AF/yr for each of the 48 dwelling units. Lots A, D, and E, also located with the residential portion of the Specific Plan area, will require a maximum of 3 AF/yr of groundwater for landscaping purposes. Because the types of businesses that may occupy the commercial parcel are unknown, a conservative maximum estimate of 5 AF/yr is assumed for the total water demand on the commercial parcel. The sum of the water usage for the residential subdivision (including lots A, D, and E) and the commercial parcel yields a total estimated water demand for the Specific Plan area of 56 AF/yr.

The 51 AF/yr residential subdivision demand is to be met by pumping groundwater from new onsite water wells. To provide the required volume of 51 AF each year will require new onsite wells to produce groundwater at a total combined pumping rate of 32 gpm, assuming the wells all pump continuously, 100% of the time each year. On a more realistic operational pumping basis of 8 hours per day (33% of the time), then the total combined pumping capacity of the new wells would need to be only about 96 gpm for the residential subdivision usage.

Because the new wells would be considered to be community-supply water wells, the County would require that the groundwater flow from the residential water system to be capable of meeting the instantaneous fire flow requirement of 750 gpm for a sustained pumping period of 2 hours. In addition, the proposed water system would also need to provide the peak residential usage flow for 2 hours during a fire event, which is calculated to be 64 gpm (double the annual residential usage, per Triad). These requirements together equal a maximum water system flow requirement of 814 gpm. Based on the operational pumping rate of the proposed wells, Workforce and Triad propose to construct an appropriate amount of onsite, subsurface water storage, capable of providing this necessary maximum water flow.

5. Groundwater in Storage

   Based on recently measured static water levels in the general vicinity of the Specific Plan area, and estimates of the thickness of the water-bearing alluvium and its specific yield, approximately 580 AF to 725 AF of groundwater is calculated to currently exist in storage directly beneath the subject property. The anticipated annual groundwater demand of the Specific Plan area (56 AF) represents only 8 to 10 percent of the groundwater that is currently in storage beneath the property and that is available to new onsite wells.

   Because of these values, and based on the known lateral separation between the two proposed onsite wells and known existing offsite wells owned by others, and also on the anticipated pumping durations for the new wells, it is our opinion that there will be no significant water level drawdown impacts on those offsite wells.

   To better define the actual amounts, if any, of the possible drawdown impacts on offsite wells that may be caused by pumping of the new onsite wells, a maximum 72-hour pumping test can be designed and conducted in the first new onsite well.

6. Water Well Feasibility and Recommended Well Sites

   It is considered hydrogeologically feasible to drill and construct at least two new, community-supply water wells on the residential portion of the Specific Plan area. Problems associated with the development of the onsite groundwater resources include:

   a. Two new wells are proposed to meet the 51 AF/yr demand of the proposed residential development (including lots A, D, and E). Although after construction and testing of a well, it may be feasible to meet this demand with a single water well, two wells are especially necessary to permit a supplemental and/or emergency supply when one of the wells/pumps is undergoing routine rehabilitation or during an emergency such as a pump failure.

   b. Individual domestic-supply wells owned by others exist to the east, north and southwest of the site; hence, the final siting, design and construction of the two new onsite wells must consider the proximity of these offsite wells.

   c. Each of the proposed onsite residential units and each offsite residence will have or has its own private subsurface disposal system. It will be important that the siting, final design, and construction of each new well meet the County-promulgated minimum separation distances between each new well and proposed/existing leachfields; It will also be important to construct each new well with a minimum 50-foot deep sanitary cement seal.

Figure 8, "Recommended Well Location Map," shows the two recommended well site locations, in priority order, for new onsite Well A and B; drill sites were selected on the basis of hydrogeological and logistical issues. Well Site A should be drilled, constructed and tested first, prior to proceeding with similar work at Site B. If either or both sites do not produce groundwater of sufficient quantity and of acceptable quality, then additional locations and/or drilling depths can readily be generated, with these alternative locations being determined on the basis of the in-situ results derived at these two initial locations.

As shown on Figure 8, the locations for the two recommended well sites are as follows:

a. Well Site A: on the western edge of proposed lot 31. The nearest offsite well is likely approximately 1000 ft to 1100 ft to the south.

b. Well Site B: on the southwestern/northwestern corner shared by proposed lots 7 and 8. The nearest offsite well likely lies approximately 550 ft to the north. Also, note that it is recommended that the new well be constructed a minimum of 30 ft from the existing agricultural well. Special well destruction methods for the existing agricultural well are provided in Item No. 3, above.

   A yellow-colored circle with a scaled-radius of 100 ft has been illustrated around each proposed well site. The radius of this circle is to illustrate the minimum separation that each well must be to meet the required 100-foot setback from possible leachfields, as set forth by the Lahontan Regional Water Quality Control Board.

   Also shown on Figure 8 is the site of the proposed water tanks, surrounded by a blue circle with an approximate scaled-radius of 150 feet. The radius of this circle represents the minimum distance that the proposed subsurface water tanks must be from any of the possible leachfields, as set forth by the Lahontan Regional Water Quality Control Board.

It should be noted that because of setback requirements (as illustrated on Figure 8), the area available for a leachfield is significantly reduced for proposed lots 7, 8, and 31, and somewhat reduced for the commercial parcel and for lots 23, 24, 25, and 32.

7. Preliminary Drilling Recommendations

   a. A pilot hole at the first recommended well site (Site A on Figure 8) should first be drilled using reverse circulation or mud rotary methods. It is likely it will be difficult to control caving in the alluvial-type units without using mud-type drilling method.

   b. Samples of the cutting should be collected every 10 feet by the driller and stored in 1 gallon zip lock-type baggies. RCS geologists will then be able to view the cuttings at a later date, if necessary

c. The driller should keep a log of changes in the drilling mud weight/density. Changing mud parameters can be an indication of water bearing zones within the pilot hole.

d. The estimated depth of the pilot borehole for the first recommended onsite well (see Figure 8) is approximately 200 ft to 250 ft. The final depth of the pilot hole may be adjusted as drilling proceeds and as geologic data are collected and analyzed.

e. A downhole geophysical survey (electric log survey) should be conducted immediately after the pilot hole has been drilled, and should include 16- and 64-inch normal resistivity surveys, a spontaneous potential (SP) survey, and a natural gamma survey.

f. Based on results of the pilot borehole (geologic log of cuttings, drilling penetration rates, estimates of borehole groundwater inflows, laboratory test data, and pilot hole electric log), a decision can then be made whether or not to complete the initial Site A borehole into a new well.

g. Depending on the conditions encountered during the drilling of Site A, the final depth of the pilot hole at Site B can be adjusted accordingly.

h. Based on the local geology, new onsite wells are expected to display the following: relatively low concentrations of total dissolved solids (TDS) and total hardness (TH), and calcium- to sodium-bicarbonate (Ca- to Na-HCO_3) water character. Although the constituents tested for were encountered at concentrations below their respective State MCLs, it is not known whether certain metal constituents like manganese are present at/near concentrations that might require treatment in the future for domestic purposes. The fact that there are numerous privately-owned wells in the area and that no water treatment units are visible and/or reported in the area, suggests that excessive iron levels of and/or manganese may not be a problem for the proposed residential development.

8. Preliminary Well Completion Parameters

a. Each new well should be constructed with an adequate cement sanitary seal to at least 50 ft. This is approximately 10 feet deeper than the deepest seal from any well for which a driller's log was available for review. This somewhat deeper cement sanitary seal is considered important to help preclude/mitigate possible future contaminant migration (from the proposed onsite private sewage disposal systems at each lot in the new residential subdivision) into the two new wells.

b. An 8-inch diameter well casing can be installed in the reamed borehole and should be adequate for the anticipated flow rates for the new well. The proposed new well should be additionally fitted with a 1-inch inner diameter PVC sounding tube alongside the permanent pump column. Installation of such a sounding tube will greatly facilitate future monitoring of water levels, and will also permit the installation of a pressure transducer to automatically record static and pumping levels in the future.

c. Spacing between the two new wells as proposed is roughly 730 ft, as shown on Figure 8. Such spacing should be adequate to preclude significant water level drawdown interference between the 2 onsite wells.

Future Hydrogeologic Services

RCS geologists can be available for the additional hydrogeologic services that will be needed during the design, construction and testing of the proposed wells. These subsequent hydrogeologic services can include:

<u>Phase 2 – Drilling Guidelines and Bid Sheets</u>

1. Preparing a set of drilling guidelines and line-item bidding documents, prior to the selection of a drilling contractor.

2. Assist in the bidding process.

<u>Phase 2 Field Geology Work During Well Construction</u>

1. Performing geologic logging of representative drill cuttings that are to be carefully collected and labeled by the drilling contractor. This will also include reviewing the contractor's notes on drill penetration rates and on the flow rates and water levels encountered in the open borehole as drilling proceeds.

2. Reviewing the driller's data on zones of possible water inflow, as drilling proceeds.

3. Observing and reviewing the electric log following completion of the pilot hole to evaluate and select aquifer zones suitable for community-supply purposes.

4. Collecting representative samples for analysis of Title 22 water quality constituents, and reviewing and evaluating the results of water quality analysis.

5. Selecting depth locations for the final blank casing and screened casing for each well.

6. Selecting a suitable slot width for the screened well casing and an appropriately graded gravel pack, based on the in-situ formation characteristics.

7. Providing geologists to observe well development and aquifer testing procedures. In addition, RCS geologists will also provide recommendations on test pumping rates and on operational pumping rates for the final new well(s).

8. Maintaining communication with the contractor during the construction, development and testing of each new well.

9. Preparing a final letter-report to help document the construction and testing of each new well. These documents are then to be forwarded to Mono County for their review during project approval.

CLOSURE

Disclaimer

This letter-report has been prepared solely for the exclusive use of Mr. Keith Hartstrom of the Mono Country Planning Department, and strictly for the existing 29-acre Specific Plan area property in Mono County, California, that is comprised of an approximately 2-acre commercial parcel and the proposed 27-acre residential subdivision that is to be known as the Mountain Vistas. This letter-report was prepared solely with specific application to the development of two new community-supply water wells well for domestic water use at the Mountain Vistas subdivision. This letter-report has been written in accordance with the care and skill generally exercised by reputable professionals currently working under similar circumstances in this or similar localities. No other warranty, either express or implied, is made as to the professional advice or opinions presented herein. Any use, interpretation, or emphasis other than that contained herein, is done at the reader's sole risk.

Respectfully,
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